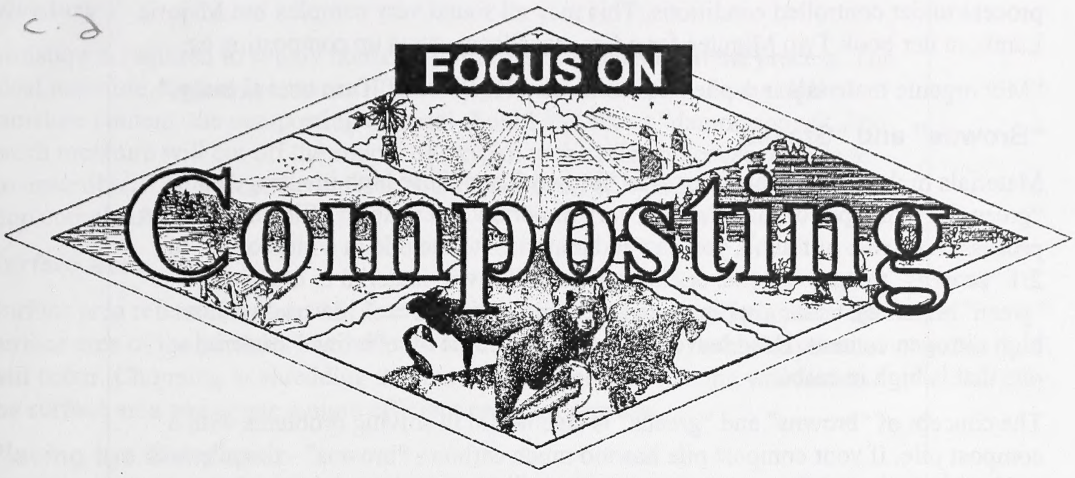

In Alberta, the largest portion of household waste is organic material. Home composting is a way of recycling organic wastes safely and simply in your own back yard.

Composting speeds up the natural breakdown of organic material. Compost contributes to better growing conditions for plants by breaking up heavy soils, increasing soil nutrient content and helping the soil retain air and water.

Composting - "A natural biological process, carried out under controlled conditions, which converts organic material into a stable humus-like product called compost." – Composting Council of Canada

What are the Benefits of Composting?

The environmental benefits of composting go way beyond your own garden. Studies have shown that about one-third of household waste is compostable. This translates into more than a half-tonne of organic waste for a family of four each year in Alberta.

When you choose to compost, you help protect Alberta's environment by:

- Reducing the amount of material you send to landfill.
- Reducing the energy spent on waste collection and disposal.
- Reducing the need for fertilizers.

Composting can provide you and your family with a group project, a chance to work outdoors or simply an excuse for regular exercise. The direct benefit of composting is that the end product makes an excellent conditioner for your garden soil.

What is Composting?

Composting is the break down of organic materials by decomposer organisms, mainly bacteria. Other organisms aid in the process, such as fungi, actinomycetes and protozoa. These organisms are found naturally in soil. The decomposer organisms feed on carbon (for energy) and nitrogen (to help build protein) in organic material. Oxygen and water are also required for the composting process. While decomposition happens naturally, composting is a way to speed up the

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process under controlled conditions. This may all sound very complex but Majorie Lamb, in her book Two Minutes for a Greener Planet, sums up composting as:

"Mix organic materials in a pile with some dirt. Keep moist. Turn occasionally."

"Browns" and "Greens"

Materials high in carbon are known as "browns" and those high in nitrogen are "greens". Both types of materials are very important to create an efficient compost process. As a rule of thumb, you can add materials to the pile in a ratio of 1:1 to 2:1 "browns" to "greens" (i.e. one or two parts 'brown' material to one part 'green' material). Grass clippings are an example of a "green" material with a high nitrogen content. Dead leaves are a good example of a "brown" material – one that is high in carbon.

The concept of "browns" and "greens" is also useful in solving problems with a compost pile. If your compost pile has too much carbon - "browns" - the pile will not heat quickly and the composting process will be very slow. Adding nitrogen-rich materials ("greens") will help speed up the process.

If the pile has a strong ammonia odour and the compost is slimy, the pile may have too much nitrogen. This can be fixed by adding carbon-rich "brown" materials.

What Environmental Factors Affect Composting?

As well as the carbon: nitrogen ratio, there are four environmental factors to consider when composting.

Aeration

Composting is an **aerobic** process. To work properly, a compost pile needs oxygen. Without oxygen, the process will become **anaerobic** and begin to produce unwanted by-products such as methane gas. To ensure a pile has enough oxygen, it is necessary to physically turn the materials in a pile on a regular basis.

Temperature

Heat is one of the by-products of composting. As the process moves along, the pile will heat due to the action of the bacteria. Heat indicates that the pile is working. If the pile is too small, the heat produced will be lost to the outside air and the process will never be complete. As a rule of thumb, a pile should be a minimum of one cubic metre in size to sustain the process. You can use a compost thermometer to monitor the pile – a good working pile should be around 50°C at the most active phase of the compost process. If you don't have a thermometer, you can push a metal rod into the middle of the pile. Leave the rod inside for about 15 minutes and then remove it. Be careful - if the pile is working at the right temperature, the rod will be very hot! If the pile gets too hot – above 60°C – the process will naturally slow down on its own.

Aerobic – A process that requires oxygen. The by-products of an aerobic process are CO_2, (carbon dioxide), H_2O (water) and heat.

Anaerobic – A process that occurs without oxygen. The by-products are CO_2 (carbon dioxide) and CH_4 (methane).

Moisture

Moisture is required to supply nutrients to the microorganisms in the process. The ideal moisture content is between 40 and 60 per cent of the pile. At the right moisture content, the composting material should feel like a "damp sponge". Too much moisture will cut off the supply of oxygen to the pile and cause the pile to go anaerobic. Too little moisture (less than 8 per cent) will cause the process to stop completely.

Surface Area

Surface area refers to the particle size of the materials in the pile. The greater the surface area of the particles available for bacteria to digest, the faster the process will occur. Chopping or shredding the materials that go into the pile will increase the surface area and create a more efficient compost process.

Placing the composter

The composter should be in a sunny or semi-sunny site. Sunlight will help add heat to the pile. The site should be level and well drained. Most importantly, the pile should be easily accessible. If the composter is not convenient, you won't use it!

What to add to your compost

Fruit and vegetables	Eggshells	Shredded vegetable stems
Non-woody yard waste	Hair	Sawdust (not pine or cedar)
Tea and coffee grounds	Houseplants	Grass clippings

A Hint – Try not to use just grass clippings in your compost. They are high in nitrogen and will throw off the carbon: nitrogen ratio if used continually. As well, grass clippings should 'dry' for a day or two before you add them to the compost. Fresh clippings will add a lot of moisture to the pile.

What not to put in the compost

- Meat, bones, fish scraps – they attract dogs, cats, rodents and insects.
- Oily, fatty materials, cheese and dairy products – oils and grease take a long time to break down and their coating effect inhibits the breakdown of other materials. These products also attract insects.
- Pet droppings – may contain disease organisms pathogenic to humans.
- Diseased plants – the heat of the pile may not kill the disease organisms or the insects or eggs infecting the plant.
- Dishwater – as with oils and grease, this will slow down the process.

Compost Bins

There are many types of compost bins. Whether you choose to buy or build one, first consider your lawn and gardening needs and the amount of organic wastes you need to compost.

Buying a Composter

Commercially available composting units have the advantage of being durable and efficiently designed. Some commercial composters are made from recycled

materials. Depending on your needs and budget, you can choose from a variety of designs.

Building a Composter

If you wish to build your own composter, many simple designs are available. The reference books at the end of the article are a good source for information on different designs.

Consider using scrap materials to lower costs and conserve resources. If you use chemically preserved wood for your compost bin, water-based and pressure-treated wood is best.

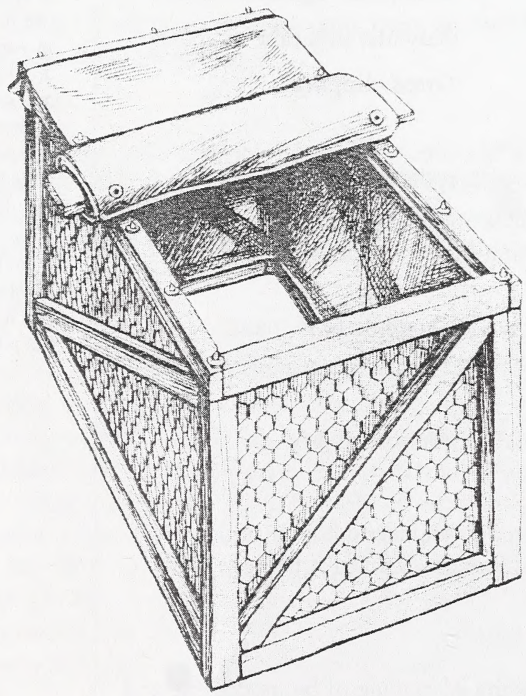
Make the composter about one cubic metre in size. Each unit in a multi-sectioned compost bin should also be about one cubic metre in size.

Allow for drainage to prevent water from collecting at the bottom of the bin.

Make the composter vermin-proof by lining the sides and bottom of the bin with 1.25 cm (½ inch) wire mesh.

Holding Composting Method

Place a layer of bulky yard waste, such as straw or twigs, on the bottom of the unit to provide aeration. Moisten the material if it is dry. This layer sets the stage for composting.



Add any of the organic materials described earlier. Layering materials of different densities will increase air circulation. Don't worry too much about these layers; you will mix them up later anyway. As you add the material, occasionally sprinkle a shovelful of soil on the layers. The microorganisms in the soil help to activate the compost process.

Use a pitchfork or stick to mix the compost every week or two. This allows air to circulate, enhances the decomposition process, and prevents odours from developing.

Check the compost for moisture and add water as necessary. It should be as moist as a damp sponge

Building a Holding Composter

The holding method is suitable for the gardener who is not in a hurry to get finished compost. This method requires less maintenance than the turning method (described later).

Materials

The holding unit can be built as a four-sided, rectangular box that is open at the top and bottom.

Build the frame of this unit with 2 x 4s to provide strength. Lightweight strips of wood, such as discarded snow fencing, may be used for the cross braces.

Use a construction stapler to attach a fine wire mesh, such as chicken wire, to the sides of the frame.

Make a detachable cover for the bin using canvas or polyethylene that will not degrade in the sun. Covering the bin protects the compost from vermin and weather.

Turning Composting Method

As with the holding method, start by placing a layer of bulky or coarse yard waste on the bottom of the unit to provide aeration. Moisten this base material if it is dry.

Alternate materials of different densities. Each layer should be about 15 cm (five inches) thick. For example, small chunks of vegetable wastes should be layered alternately with uncompacted material, such as plant stalks.

Sprinkle in some soil after every 25 to 30 cm (10 to 12 inches) of new material that you add. The natural composting organisms in the soil aid the decomposition process.

Turn the pile every week or two. This supplies air and new material to the composting organisms. Fork the compost into an empty section, then return ~~the~~ any unprocessed material to the original bin.

Maintain the pile so that it retains a sponge-like dampness. If the compost is slimy looking and smells sulphurous (like rotten eggs), mix in dry yard waste ("browns") and leave the cover off to reduce the moisture content. If it becomes too dry, sprinkle water on the pile and mix.

Cover the pile to protect it from frost and rain. If the pile gets too wet, it will cool, and slow or even halt the composting process.

Building a Turning Composter

The turning method of composting is suitable for households with a large amount of material to compost. The recommended unit is basically a 3-sided box that is a

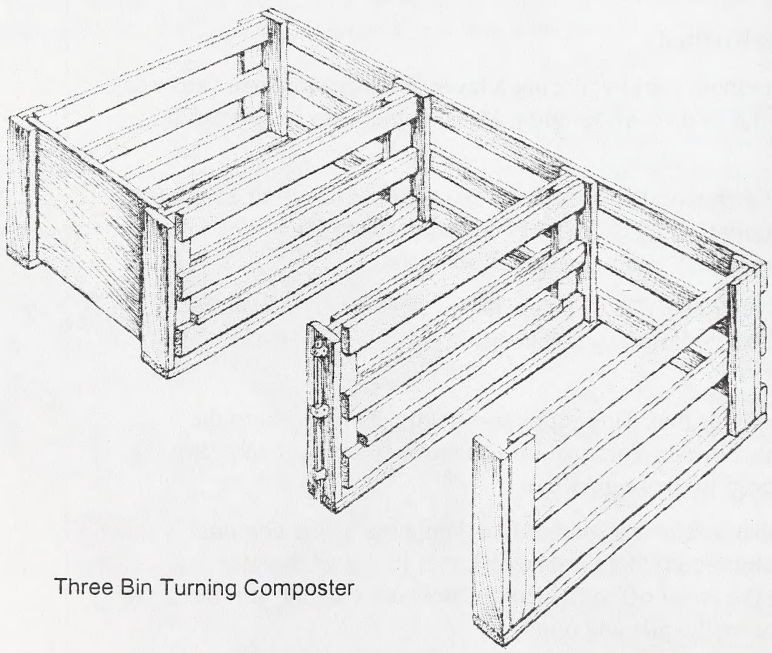
cubic metre in size, open at the top and bottom, with one or two additional sections beside it.

The triple-sectioned unit shown below provides a second bin to transfer compost material when you turn it, and a third section which can be used to store finished compost. If you don't know how much compost you will have, start with just one section and attach additional sections as required.

Materials

One inexpensive and convenient construction method is to use discarded pallets. Pallets are the right size; they are slatted, which allows for ventilation; and they can serve as pre-built walls for the bin. You will need seven pallets for a triple-sectioned unit. You will also need a cover for the bin, and stakes to keep the unit secure. You may wish to add planks to the front of the composting sections to further contain the material.

If you lash the pallets together with hook and eye assemblies you will be able to disassemble the bin and move it easily. Use nails or screws to fasten the boards or pallets together if you prefer.



Three Bin Turning Composter

Helpful Hints

Maintenance

- Crush or shred bulky material to speed up decomposition.
- If the compost is too cold, add materials, such as grass clippings, that are high in nitrogen. Add new composting material if the pile is only warm in the centre. Consult a gardening or composting book to fine tune the process.
- To prevent odours, turn the pile every week or two. This provides the composting material with sufficient air.
- Don't let the pile get too wet. If it does, the pile may begin to smell sulphurous (like rotten eggs). Simply turn it and add new material.
- If the compost begins to smell sharp, like ammonia, it means the nitrogen level is too high. Mix in some high-carbon material to correct this problem.
- Do not wait until eggshells disintegrate to use the compost.

In Winter

Unprocessed compost that is left at the end of summer can be composted the following spring - just let it freeze in the compost bin.

While composting comes to a halt in Alberta winters, that doesn't mean that you have to throw away kitchen scraps. These can be safely left to freeze outside in a sealed garbage bin or in a compost pile for the winter.

In the fall, if you have many leaves and no separate bin for them, just place them in a contained area and shred them with a weed trimmer or lawn mower. Then store them in bags under the porch or in the garage for the winter.

When you start again in the spring, intersperse layers of the old, unprocessed material with new material. You may want to speed up the decomposition of leaves by adding manure or other high nitrogen materials.

Vermicomposting - composting using worms - is another way of dealing with organic waste during the winter.

Finishing Up

Finished compost is dark, lightweight and earthy-smelling, with a layer of unprocessed material on top. Finished compost –even that which has been recently turned – will be cold to the touch.

Remove the finished compost and return the unprocessed top layer along with any large chunks to the bin for processing. Small chunks of vegetation in the compost can be dug into your garden.

Summary

Composting is a simple, yet effective way of reducing your household waste. While the process may appear complex, some common sense and attention to a few simple principles will result in an excellent product to enhance your garden and an environmental benefit to your community. Give it a try!

Additional References

Books

Let It Rot! The Gardener's Guide to Composting. Stu Campbell, Storey Publishing

The Real Dirt. Mark Cullen and Lorraine Johnson. Penguin

The Rodale Guide to Composting. Jerry Minnich and Marjorie Hunt. Rodale

Websites

Composting Council of Canada - http://www.compost.org/englishoverview.html

Recycling Council of Alberta - http://www.recycle.ab.ca

City of Edmonton Waste Management Branch - http://www.gov.edmonton.ab.ca/am_pw/waste_management/

Alberta Environment – Action on Waste - http://www3.gov.ab.ca/env/waste/aow/index.html

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